

## Exhibit F

rates for service as a common-carrier-by-pipeline are based on our cost-of-service, which include capital and operating costs, and are paid by shippers. Uneconomic rates due to unreasonable costs deter shippers. It is entirely possible that impasse situations could develop with landowners where it is neither economically sensible nor efficient operationally to reroute. In such an event, as we stated in the data request response, the feasibility of the Extension project, and potentially of the Texas Access project, would have to be re-evaluated. There is no guarantee that either could or would proceed in such circumstances.

16Q. WOULDN'T A DECISION TO CANCEL EITHER OR BOTH PROJECTS BE WELCOMED BY MANY, INCLUDING SOME OF THE INTERVENORS?

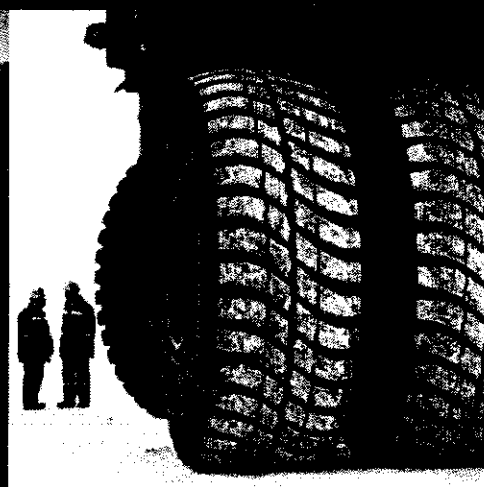
A. From the tone of their comments, it might be. However, when one looks at the big picture, such a result would not be good for Illinois consumers and businesses nor the United States. [REDACTED]

[REDACTED]

Simply put, if the oil cannot be efficiently moved to markets in and via Illinois, market forces will prevail and the supply will simply bypass Illinois for other American markets or move to non-American markets.

17Q. WHAT DO YOU MEAN BY THE "TONE OF THEIR COMMENTS?"

A. There are various assertions and statements in some of the intervenors' filings that distort facts and incite emotions. Enbridge is variously attacked as being a "foreign" or "Canadian" entity seeking to exploit Illinois landowners on behalf of "Big Oil" and as



## AN ENERGY MARKET ASSESSMENT JUNE 2006

Canada



National Energy  
Board

Office national  
de l'énergie

# Canada's Oil Sands

**OPPORTUNITIES AND CHALLENGES TO 2015: AN UPDATE**

AN ENERGY MARKET ASSESSMENT JUNE 2006

Canada

## MAJOR CRUDE OIL PIPELINES

### 5.1 Introduction

As discussed in *Chapter 3: Crude Oil Supply*, rapid expansion of the oil sands is expected to occur within the next decade while *Chapter 4: Markets* highlighted that markets will need to be determined. Pipeline infrastructure will need to be addressed to accommodate the increase in supply and market requirements. This chapter focuses on the major export pipelines and feeder pipelines, including announced expansions of existing pipelines and new greenfield projects.

In some instances, oil pipelines are embarking on a new era of contractual arrangements. Historically, oil pipelines, with the exception of Express, operated under common carriage. With the intense competition between announced pipeline proposals and refiners' need for security of supply, some pipeline companies are moving toward "take-or-pay" agreements with shippers to ensure there is support for these initiatives.

The number of proposed pipeline expansions and new proposals are causing delays within the industry's decision-making process. This coupled with environmental, Aboriginal and landowner concerns could delay pipeline development.

### 5.2 Crude Oil Pipelines

Canada delivers crude oil to the export market through three major Canadian trunklines (Figure 5.1):

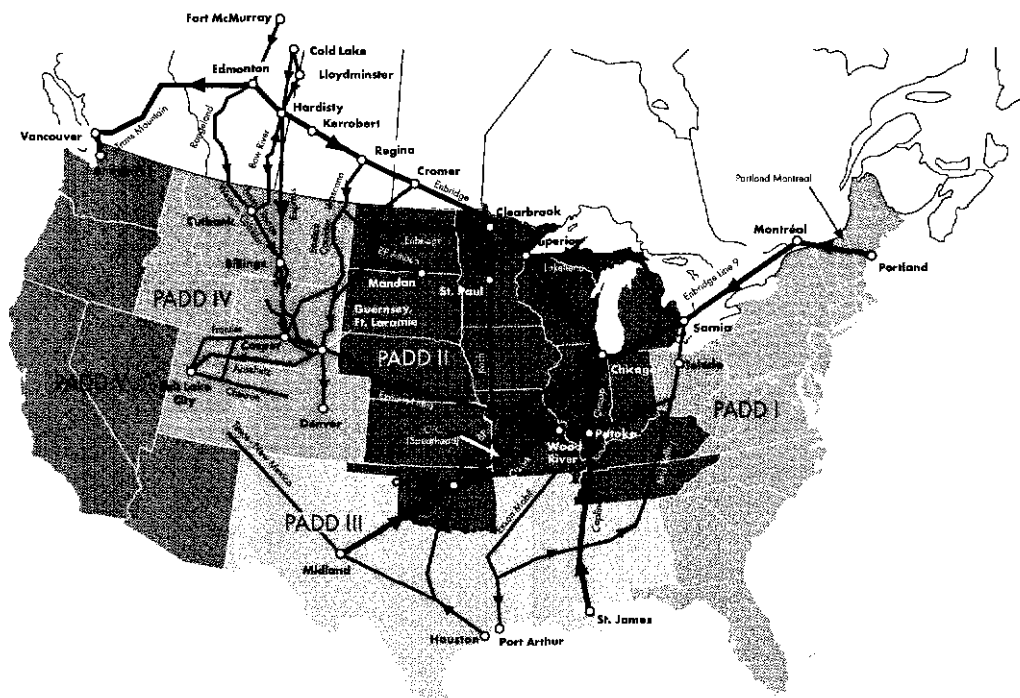
- Enbridge's mainline originates at Edmonton, Alberta and extends east across the Canadian prairies to the U.S. border near Gretna, Manitoba. At the U.S. border, it connects with the Lakehead system to deliver crude to the U.S. Midwest and north to Sarnia, Ontario.
- Kinder Morgan's Trans Mountain (formerly Terasen) pipeline originates at Edmonton, Alberta and extends west across British Columbia for delivery to Burnaby, British Columbia, the Westridge Dock and Washington State.
- Kinder Morgan's Express pipeline originates at Hardisty, Alberta and delivers crude to locations in PADD IV and connects to the Platte system in Casper, Wyoming for delivery to southern PADD II.

#### Enbridge Pipeline

The Enbridge system in Canada and the Lakehead system in the U.S. represent the largest crude oil pipeline in the world and the primary transporter of crude oil from western Canada to markets in eastern Canada and the U.S. Midwest. The system delivers approximately 333 000 m<sup>3</sup>/d (2.1 MMB/d) of crude oil. In the third quarter 2005, to facilitate growth in heavy crude oil, Enbridge completed the Terrace Phase III expansion project. By converting Line 2 from heavy to light service, and Line 3

FIGURE 3.1

### Major Canadian and U.S. Crude Oil Pipelines and Markets



from light to heavy service, it increased its capacity to move heavy crude by 39 000 m<sup>3</sup>/d (245 Mb/d). In doing so, Enbridge reduced light capacity by 18 400 m<sup>3</sup>/d (116 Mb/d). Recently, Enbridge has been operating at or near capacity and in some instances certain lines have been under apportionment.

To accommodate growing oil sands production and the need for additional markets, Enbridge received approval for a non-routine adjustment for tolls to reverse two pipelines in the U.S. The Spearhead and Mobil 20-inch reversal projects will provide access to southern PADD II and the U.S. Gulf Coast, respectively. It is estimated that Spearhead will deliver 19 900 m<sup>3</sup>/d (125 Mb/d) versus signed commitments of 9 500 m<sup>3</sup>/d (60 Mb/d). Enbridge has indicated that it would respond to shipper requirements on Spearhead in the near-term to increase capacity to 30 200 m<sup>3</sup>/d (190 Mb/d), and in the longer-term, it has proposed a looping program with the first phase providing a further increase of 15 900 m<sup>3</sup>/d (100 Mb/d). The Mobil line made its first crude oil deliveries to the U.S. Gulf Coast in the first quarter 2006.

#### Kinder Morgan Express Pipeline

In April 2005, Express completed its expansion of 17 500 m<sup>3</sup>/d (110 Mb/d) to bring its capacity to 44 800 m<sup>3</sup>/d (282 Mb/d). Recently, the Express system has been operating at capacity and, at times, there has been apportionment on the Platte system. Kinder Morgan is assessing expansion plans to deal with capacity issues on the Platte system.

#### Kinder Morgan Canada Terasen Pipelines (Trans Mountain) Inc.

Trans Mountain pipeline transports crude oil and petroleum products from Edmonton to Vancouver, Washington State and offshore via the Westridge Dock. In November 2005, Kinder Morgan purchased Terasen Inc., making it a major oil pipeline player in Canada. Its current capacity is

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35 700 m<sup>3</sup>/d (225 Mb/d) and it has been operating at or near capacity for several years and, on many occasions, has been under apportionment. Kinder Morgan has carried forward Terasen's plans to expand the scale and the scope of the Trans Mountain system. The TMX project announced in 2004 comprises three phases, including an initial Anchor Loop expansion, followed by a southern or northern option. On 10 November 2005, part of TMX1, which included a capacity increase of 5 600 m<sup>3</sup>/d (35 Mb/d), received approval from the NEB. This will increase the capacity from 35 700 m<sup>3</sup>/d (225 Mb/d) to 41 300 m<sup>3</sup>/d (260 Mb/d). On 17 February 2006, Kinder Morgan filed an application with the Board for the Anchor Loop project. The project involves twinning a 158 kilometre section of the existing line between Hinton, Alberta to a location near Rearguard, British Columbia. If approved, the Anchor Loop would add 6 400 m<sup>3</sup>/d (40 Mb/d) of incremental capacity, bringing the Trans Mountain system to 47 700 m<sup>3</sup>/d (300 Mb/d) by the end of 2008.

It is expected that Kinder Morgan could file the next phase of the TMX project in the first quarter 2007. TMX2 would involve the looping of the Trans Mountain pipeline from Edmonton to the Anchor Loop expansion (Hinton) and from the anchor loop (Rearguard) increasing capacity by 15 900 m<sup>3</sup>/d (100 Mb/d) to 63 600 m<sup>3</sup>/d (400 Mb/d). The in-service date is estimated to be January 2010.

The final phase of the project, TMX3, involves the completion of a south leg and/or a north leg. For both legs, capacity out of Edmonton would be 175 000 m<sup>3</sup>/d (1.1 MMb/d). The south leg from Kamloops to Vancouver would add 47 600 m<sup>3</sup>/d (300 Mb/d) and have a total capacity of 111 000 m<sup>3</sup>/d (700 Mb/d). The north leg from Rearguard to Kitimat would have a capacity of 63 600 m<sup>3</sup>/d (400 Mb/d). The in-service date for both legs is proposed for 2011.

### **Enbridge Southern Access**

Enbridge has proposed the Southern Access program to expand and extend service on the mainline system. It would provide incremental capacity to Chicago, Wood River and Patoka and access to Cushing. In May 2006, Enbridge filed an application with the Board for Phase 1 of its Southern Access program to increase capacity by 19 000 m<sup>3</sup>/d (120 Mb/d) with a scheduled in-service date of Fall 2006. The expansion would consist of debottlenecking and pump additions on Lines 3 and 4 from Edmonton and Hardisty, respectively. In the U.S., industry has decided to increase the pipe diameter from Superior to Flanagan/Chicago to 42 inches from the original proposal of 30 inches to reduce power costs and allow for future expansion. The initial capacity on the U.S. system would be 63 600 m<sup>3</sup>/d (400 Mb/d) by early 2010 and expandable to 127 000 m<sup>3</sup>/d (800 Mb/d). Enbridge continues to look at extending Southern Access to either or both Wood River or Patoka. Patoka offers more storage and better access to other pipelines and refineries.

Enbridge is assessing several other pipeline options from the Patoka area. They include expanding existing lines, such as Spearhead as well as reversing lines which could include, Seaway pipeline (Cushing to Houston); Ozark pipeline (Cushing to Wood River); and Mid Valley (Longview to Toledo).

### **Enbridge Southern Lights**

The industry has been looking at alternatives to increase its diluent supply in Alberta. One initiative that Enbridge has been studying is the potential for diluent return service from the Midwest. Supply sources from this area could come from refineries, the U.S. Gulf Coast/Midcontinent, Rocky Mountain volumes and imports. In addition, the Southern Lights project would include an expansion of light crude oil capacity on the Enbridge mainline.

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The Southern Lights Pipeline (diluent line) would include the reversal of Line 13 from Clearbrook, Minnesota to Edmonton, Alberta and new pipeline construction between Clearbrook and Manhattan, Illinois (near Chicago). The pipeline would have a total capacity of 28 600 m<sup>3</sup>/d (180 Mb/d).

The expansion of light crude oil capacity on the Enbridge mainline would occur in parallel with the diluent return line. It would include an expansion of Line 2 between Edmonton and Superior, Wisconsin to 70 300 m<sup>3</sup>/d (440 Mb/d) and construction of a light sour line from Cromer to Clearbrook of 29 500 m<sup>3</sup>/d (185 Mb/d). This would eliminate the need for breakout storage tanks at Cromer.

Enbridge plans to synergize this project with the Southern Access Program. The project if approved could be in-service by the first quarter of 2009.

### **TransCanada Keystone Pipeline**

In February 2005, TransCanada announced its Keystone Pipeline project. This is a 2 800 kilometre, 69 200 m<sup>3</sup>/d (435 Mb/d) crude oil pipeline that would extend from Hardisty, Alberta to markets in the U.S. Midwest. TransCanada intends to convert one gas line in Canada to oil service and construct a new pipeline from the Canada/United States border to Wood River/Patoka, Illinois. On 31 January 2006, TransCanada announced that it had received long-term contractual commitments of 54 000 m<sup>3</sup>/d (340 Mb/d). ConocoPhillips Pipe Line Company has signed a memorandum of understanding with TransCanada to acquire up to a 50 percent participating interest in the project, and ConocoPhillips has committed to ship crude oil on the pipeline. The proposal includes an expansion to 93 800 m<sup>3</sup>/d (590 Mb/d) with the addition of pump stations.

### **Enbridge Alberta Clipper Pipeline**

In February 2006, Enbridge unveiled its newest pipeline initiative, the Alberta Clipper. The proposal is for a 36-inch contract carrier crude oil pipeline that would have an initial capacity of 63 600 m<sup>3</sup>/d (400 Mb/d), expandable to 127 200 m<sup>3</sup>/d (800 Mb/d). The Alberta Clipper would run alongside Enbridge's mainline right-of-way from Hardisty, Alberta to Superior, Wisconsin and connect into existing infrastructure delivering crude oil into the Chicago area. The proposed in-service date would be 2010 or 2011.

### **Altex**

Altex Energy is proposing to construct an oil pipeline from northeastern Alberta to the U.S. Gulf Coast by the fourth quarter 2010. It would have a minimum capacity of 39 700 m<sup>3</sup>/d (250 Mb/d) with significant expansion potential. Altex has said that utilizing proprietary pipeline technology it could eliminate the need for condensate thereby greatly reducing the cost of transporting bitumen.

### **Enbridge Gateway Pipeline**

Enbridge's proposed Gateway Pipeline would consist of two elements, a 63 600 m<sup>3</sup>/d (400 Mb/d) crude oil pipeline and a 23 800 m<sup>3</sup>/d (150 Mb/d) return condensate line. The crude oil line would originate in Edmonton for delivery to Kitimat and the condensate line would operate in the reverse direction, providing transportation for imported condensate. The crude oil and condensate lines could have ultimate capacities of 87 400 m<sup>3</sup>/d and 39 800 m<sup>3</sup>/d (550 Mb/d and 250 Mb/d), respectively. Both lines have a target in-service date of first half 2010.

Following the successful open seasons of both pipelines, Enbridge announced plans to increase the diameter of the condensate line to 20 inches and the crude oil line to 36 inches. Non-binding interest



in excess of 63 600 m<sup>3</sup>/d (400 Mb/d) was received for the crude oil line. Enbridge has signed a memorandum of understanding with PetroChina to supply 31 800 m<sup>3</sup>/d (200 Mb/d) of crude oil to China. There have also been discussions that PetroChina may purchase a stake in the line.

### Pembina Spirit Pipeline

In October 2005, Pembina Pipeline Income Fund (Pembina) and Terasen Pipelines Inc. announced a proposal to import 15 900 m<sup>3</sup>/d (100 Mb/d) of condensate into Kitimat and deliver it by pipeline to Edmonton. The proposal would utilize existing infrastructure and some new pipeline construction would be required. The proposed in-service date would be April 2009.

In February 2006, Pembina announced that it would pursue the Spirit Pipeline on its own, without the support of Kinder Morgan Canada (formerly Terasen Pipelines Inc.). Pembina announced in April 2006 that it has entered into a development support agreement with a group of shippers.

### Conclusion

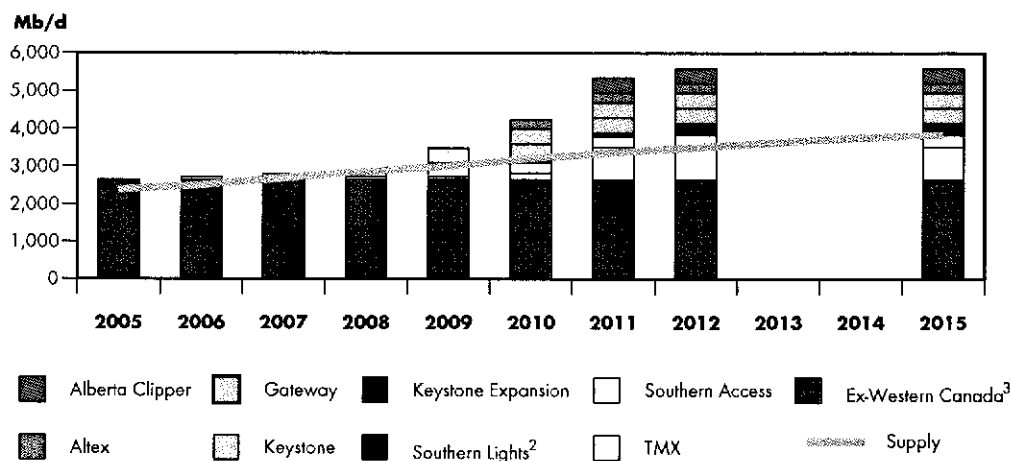
Figure 5.2 illustrates the production forecast for the Western Canada Sedimentary Basin (WCSB), the proposed pipeline projects, and the proponents estimated completion date. Based on the number of pipeline projects being proposed and the production that is forecast to come out of the WCSB, it is apparent that not all projects will move forward. However, as mentioned in *Chapter 4 – Markets* and as evident in the chart, pipeline capacity is expected to be tight starting in 2007.

## 5.3 Feeder Pipelines

In addition to the proposed expansions and greenfield projects announced by the major export lines, feeder pipelines within Alberta are expanding to transport growing oil sands volumes to the major hubs of Edmonton and Hardisty. These proposed expansions are described below.

**FIGURE 5.2**

### NEB Supply Forecast and Proposed Pipeline Projects and Timing<sup>1</sup>



<sup>1</sup> The pipeline projects are listed alphabetically.

<sup>2</sup> Edmonton to Cramer.

<sup>3</sup> Total pipeline capacity out of the WCSB.

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### **Enbridge Waupisoo Oil Sands Pipeline**

Enbridge announced in September 2005 that it will proceed with its proposed Waupisoo oil pipeline. The line would originate at Enbridge's Cheecham terminal on the Athabasca system and terminate adjacent to Enbridge's mainline Edmonton terminal. Initial capacity would be 55 600 m<sup>3</sup>/d (350 Mb/d) with a maximum capacity of 95 400 m<sup>3</sup>/d (600 Mb/d). It would also include a 16-inch return diluent line from Edmonton to the Fort McMurray area. If approved, the expected in-service date would be mid-2008.

The Waupisoo pipeline would be operated by Enbridge and shippers include, ConocoPhillips Canada, Petro-Canada, Suncor Energy and Total E&P Canada Ltd.

### **Kinder Morgan Corridor Pipeline**

In August 2005, Terasen Pipelines (now Kinder Morgan Canada) announced plans to expand the Corridor pipeline. Currently, the Corridor pipeline system includes a 24-inch bitumen blend line and a 12-inch diluent return line. The proposed expansion includes building a new 42-inch bitumen line and upgrading pump stations along the existing system from the Muskeg River Mine north of Fort McMurray to Shell's Scotford upgrader near Edmonton. It would increase dilbit capacity to 79 500 m<sup>3</sup>/d (500 Mb/d) by 2009 and would be designed to further support expansions in the future. It is estimated that future expansions of this system could lead to a capacity of 174 900 m<sup>3</sup>/d (1.1 MMb/d).

### **Pembina Horizon Pipeline**

In August 2005, Pembina Pipeline Corporation (Pembina) announced that it would twin the existing Alberta Oil Sands Pipeline resulting in two parallel, commercially segregated lines. One would be dedicated to Canadian Natural Resources (CNRL) and would transport synthetic crude oil from CNRL's Horizon project. The new line would connect with the existing infrastructure. It could be in-service by July 2008 and have a capacity of 39 700 m<sup>3</sup>/d (250 Mb/d).

### **Pembina Cheecham Pipeline**

In January 2006, Pembina announced that it had reached an agreement with ConocoPhillips Surmont Partnership, Total E&P Canada Ltd., Nexen Inc. and OPTI Long Lake L.P. for the construction of the Cheecham lateral pipeline. Pembina has entered into transportation agreements with shippers for up to 21 600 m<sup>3</sup>/d (136 Mb/d). Construction is underway and the line is expected to be in-service by November 2006. It will transport synthetic crude oil for delivery to a terminal facility located near Cheecham, Alberta.

## **5.4 Outlook: Issues and Uncertainties**

It is clear that increasing western Canadian production, driven largely by the oil sands has resulted in several proposed pipeline expansions or greenfield pipeline projects. The industry has some challenging times ahead with the increase in production and the resulting lack of capacity on the major export pipelines. The pace of pipeline expansion will largely depend on market conditions and the necessary regulatory approvals. In this regard, pipelines may be looking to shippers for financial support in the form of take-or-pay agreements.

It is expected that, if high prices continue and the market remains strong, apportionment on export pipelines will be an issue. In the short-term, the industry will add smaller incremental capacity

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expansions in an attempt to alleviate some of these capacity issues. Table 5.1 illustrates current expansion proposals that are either before the Board, have been publicly announced or are being considered by industry.

The next decade will be a critical period in terms of pipeline development. There are a number of issues and uncertainties that will impact the pace of expansion to 2015 including:

- **Crude oil prices:** See Chapters 3 and 4.
- **Bitumen blend, bitumen or synthetic:** Pipelines will need to be developed based on the type of oil sands crude oil that is produced and required by the market.
- **Cost of projects:** With the cost of labour and materials rising to unprecedented levels, project costs are rising at alarming rates. It is estimated that the costs of some pipeline projects have risen 25 percent since they have been announced.
- **Type of carriage:** Historically, oil pipelines have generally been common carriers, but there may be a desire by the project proponents to seek take-or-pay commitments.

**TABLE 5.1**

**Announced and Potential Expansions by Canadian Pipelines**

Pipeline	Potential Filing Date	Capacity Increase (Mb/d)	Proponents' Estimated Completion Date	Market
Terasen (TMPL)		75		PADD V
(Phase One TMX1)	Filed July 2005	35	April 2007	Offshore/Far East
(Phase Two TMX1)	Filed February 2006	40	Nov 2008	
Southern Option		700		PADD V
(TMPL TMX2)	01 Q2007	100	Jan 2010	Offshore/Far East
(TMPL TMX3)	N/A	300	2011	
Northern Option (TMX)	N/A	400	2011	PADD V Offshore/Far East
Enbridge Gateway (oil/diluent)	June 2006	400/150	Mid 2010	PADD V Offshore/Far East Alberta (diluent line)
Pembina Spirit (diluent)	N/A	100	April 2009	Alberta
Enbridge Southern Lights				
Southern Lights (diluent)		180		Alberta
Line 2 Expansion (oil)	N/A		2009	
Edmonton to Cromer		103		PADD II
Cromer to Clearbrook		33		PADD II
Clearbrook to Superior		33		PADD II
New sour line Cromer to Clearbrook		185		PADD II
TCPL (Keystone)	June 2006	400	2009	Southern PADD II/ PADD III
Alberta Clipper	N/A	400	2010/11	Southern PADD II
Altex Energy	N/A	250	4Q2010	PADD III
Enbridge (Southern Access)		315		Midwest/Southern PADD II
Phase I	May 2006	120	Oct 2006 and Feb 2007	
Phase II	N/A	148	2008/09	
Phase III	N/A	47	N/A	

N/A - Not Available



## ENBRIDGE EXPANSION

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## Southern Lights

The Southern Lights Project contributes to a North American solution to energy reliability and security of liquid petroleum supply by transporting light hydrocarbons from the Chicago area to Alberta's oil sands.

Enbridge's Southern Lights Project is designed to bridge the gap between the available supply of light hydrocarbons (referred to as "diluent") from U.S. refineries and supply centers and increased demand for diluent by petroleum producers in the oil sands and heavy crude oil production regions in Western Canada. Diluents are light hydrocarbons that are used to dilute heavy crude oil and bitumen (a thick, tar-like form of oil found in the oil sands) to a consistency that is thin enough to be transported by pipeline.

The pipeline will connect Canada's vast oil sands with key refinery markets in the U.S. Midwest, and it will require new pipeline and use of some segments of existing Enbridge pipeline that will be reversed for south-to-north diluent service. A separate diluent pipeline is proposed to be built from Edmonton, Alberta, to the heavy oil sands region in northern Alberta.

The project also will require the construction of a new 313-mile, 20-inch crude oil pipeline from Cromer, Manitoba, to Clearbrook, Minn., to replace the capacity of an existing Enbridge pipeline that will be converted to diluent service.

Access to a secure and more reliable supply of diluents from U.S. refining centers will, in turn, facilitate increased production of growing supplies of crude oil for delivery to the United States from Canada.